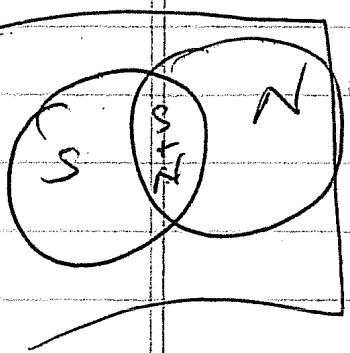
EXHIBIT D

AFB

liquified animal fat/preparations or vegetable oil (corn, sunflo, peanu, palm, canola)
(incl. butter. Fish oil, lard, tallow)
for pet foods,

ammonium sulfide?

sulfur-donating reagent (cheaper by far)
eg, ① salt, such as sulfides (Na, K, Ca, et
② cysteine, methionine
cystine (2 S's linked together)
other S-containing A.A's
③ short peptide, such as glutathione
④ elemental sulfur (S_2? yellow powder)
recombine w/ fat or fat residues
⑤ "sulfide liquor" from industrial (eg, paper, molas
corn step liquor)
mutual goal -
add S to a fatty carrier that
① won't let powders settle out -
powders typically don't "mix" soluble
in fat
easier to handle; sticks great



Ammonium sulfide - could work, but
odor problems likely - incl. on final
food, if any Am remains

N-donating reagents

① ~~cooked~~ micro-org such as yeast - est. 10%-13% N by dry weight
fungal mycelia (straw)
food-grade bacteria w/known high N content

② basic AA's
~~Arg~~ arginine (& N's)

③ urea -

④ nucleotides -
more eff. than yeast, but possible

⑤ guanidino groups

⑥ heterocyclics -
but only if reactive, ready to donate
w/lot of cooking costs!

~~Pet~~

~~Pet~~

distillers / brewers / bakers yeast
torula yeast - used to break down "sulfide liquors" from paper-making

Two main ways
(1) low heat = < 98°C
(anything under boiling)
(2) under pressure

reflux - tends to be lower losses

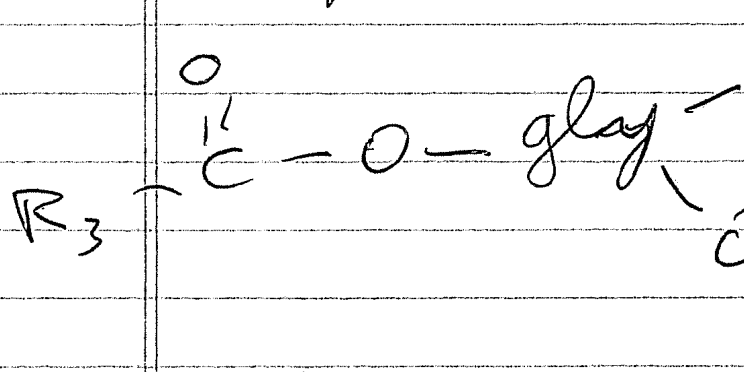
typical, if pressure used
~~120~~ 170 to 200°C
10 psig to ~~[redacted]~~ psig (gen. by heat
15 min to 1 hr, with ramps
temperature

typical, if reflux used
~~[redacted]~~ 90 to 98°C,
ambient pressure, but closed vessel
1 to 6 hours
condensate returned to cooking vessel

Parr vessel = pressure cooker
pressure, programmable
≈ triglycerides [veg. oils - triglycerides, but diff FA's]
fat = combination of fatty acids + glycerol (3 carbon), alcohol), triol

[glycogen = mostly muscle, liver, for quick breakdown] not in fat

in fat -
covalent bonds betw. FA's + glycero
~~Sapon~~ ester



where R1 - R3 are FA's

saponification - breaks the ester bonds
can be complete or partial
will regenerate COOH (COO^-) gro
on FA's

the N + S will react w/ C's where bonds were broken in HC chains - the heat breaks those bonds

goal - get smaller pieces / chunks from HC's + ☆ c'hydrates with N and/or S attached to small pieces

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chains -
liquified triglyceride prep - can be saponif before N/S addition

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one good case of S added, w/o N source

S tends to give roasted flavor, "savory" dogs tend to prefer, cats less so, but they like fat-derived preps